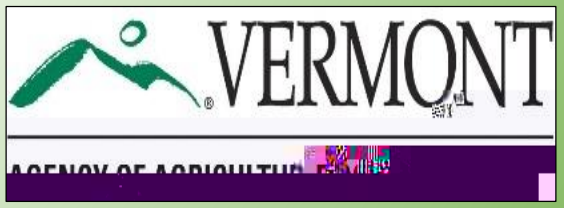

VERMONT

Neonicotinoids

- Modeled after Nicotine
- Low mammalian toxicity
- Systemic insecticides
  - Neonicotinoid taken up by plant or crop
  - Insect feeds on plant
  - Causes insect paralysis which leads to death
- Much concern over the impact of these pesticides on pollinators

Agency research = evaluate potential impacts of seed treatments in the environment

- Pollen
- Surface waters
- Tile drains
- Soil
- Vegetation

Neonicotinoids in Vermont

One way neonicotinoids enter the state is as seed treatments on corn and soybeans

Neonicotinoids used as seed treatments

- Corn = thiamethoxam and clothianidin
- Soybean = imidacloprid

Purpose = protect seeds and seedlings from insect pests; wireworms & grubs

Pollen and nectar could contain neonicotinoids from treated crop

Estimated annual acreage of treated seed planted in Vermont (2018)

- 100,000 – 120,000 acres of corn
- 2,500 – 3,000 acres of soybeans

Treatments may not be completely taken up by plant and may enter the environment; soil, water, & non-target plants

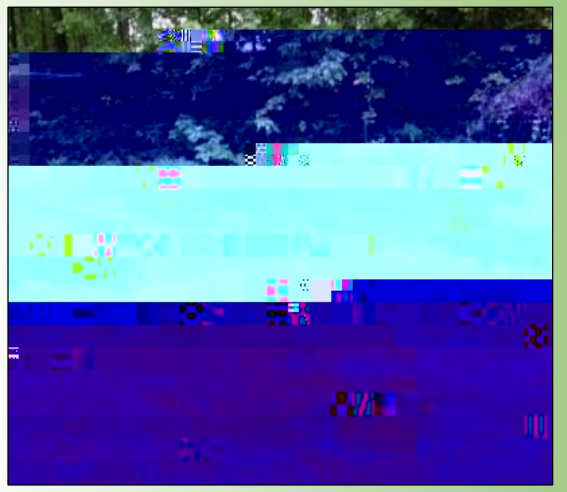
Vermont Surface Water

2014 – 2018: 252 surface waters tested

Areas of high agricultural use

3 positive for imidacloprid
- All below acute benchmark

More detections thiamethoxam and clothianidin
- Usually at time of planting



A surface water sampling site.

Summary of neonicotinoid results from the surface water samples.

Neonicotinoid	Positive detection	Detection range	Acute benchmark*	Chronic benchmark*	Results ≥ Acute benchmark*
	#	ppb	ppb	ppb	#
Thiamethoxam	26	0.05 - 1.73			

*aquatic invertebrates

Vermont Soil

2016 Sampling

High agricultural use; corn, soy/corn, soy/soy, & alfalfa/grass

Three dates; June, September, & December

Three depths; 0-12, 12-24, & 24-36 inches

Next to tile drains.

Results

Corn fields = several positive detections of thiamethoxam & clothianidin (2.08 -14.13 ppb)

- Most during planting (June)
- 0 – 12 inches

Soy field = positive detection of imidacloprid (6.43 ppb)

- 0 - 12 inches

Vermont Vegetation

Question: Are neonicotinoids being taken up by non-crop plants?

Sampling:

- September 2015 & 2016
- Vegetation collected from surface and tile drain water sampling areas in Franklin county
- Goldenrod = forage source for pollinators-later season
- Positive control = corn leaves from treated seed
- Corn leaves only positive detection
  - Clothianidin (2.91 ppb)

New York Subsurface and Surface Water, (2017-2018)

- Collaboration with Miner Institute, Chazy, NY
- Samples from edge-of-field research project
  - Comparing subsurface tile and surface water
  - Fields - continuous corn
  - Seed treated with neonicotinoids

Results

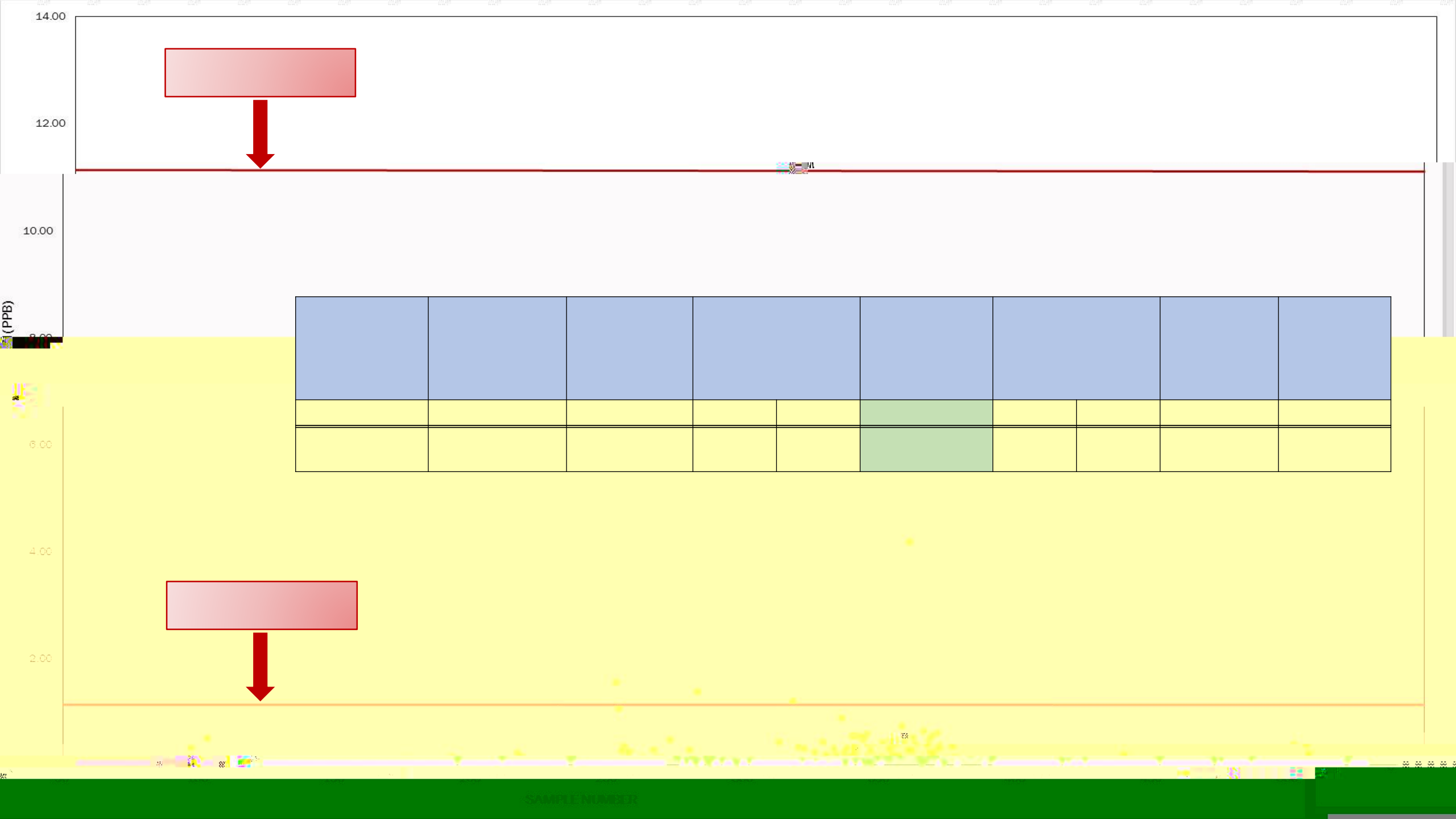
- 128 samples analyzed
- 27 positive detections total
  - Thiamethoxam (0.06-6.48)
  - Clothianidin (0.08-0.40)
  - No imidacloprid
- Highest detections;
  - Surface water
  - All below acute benchmark
  - During and right after planting

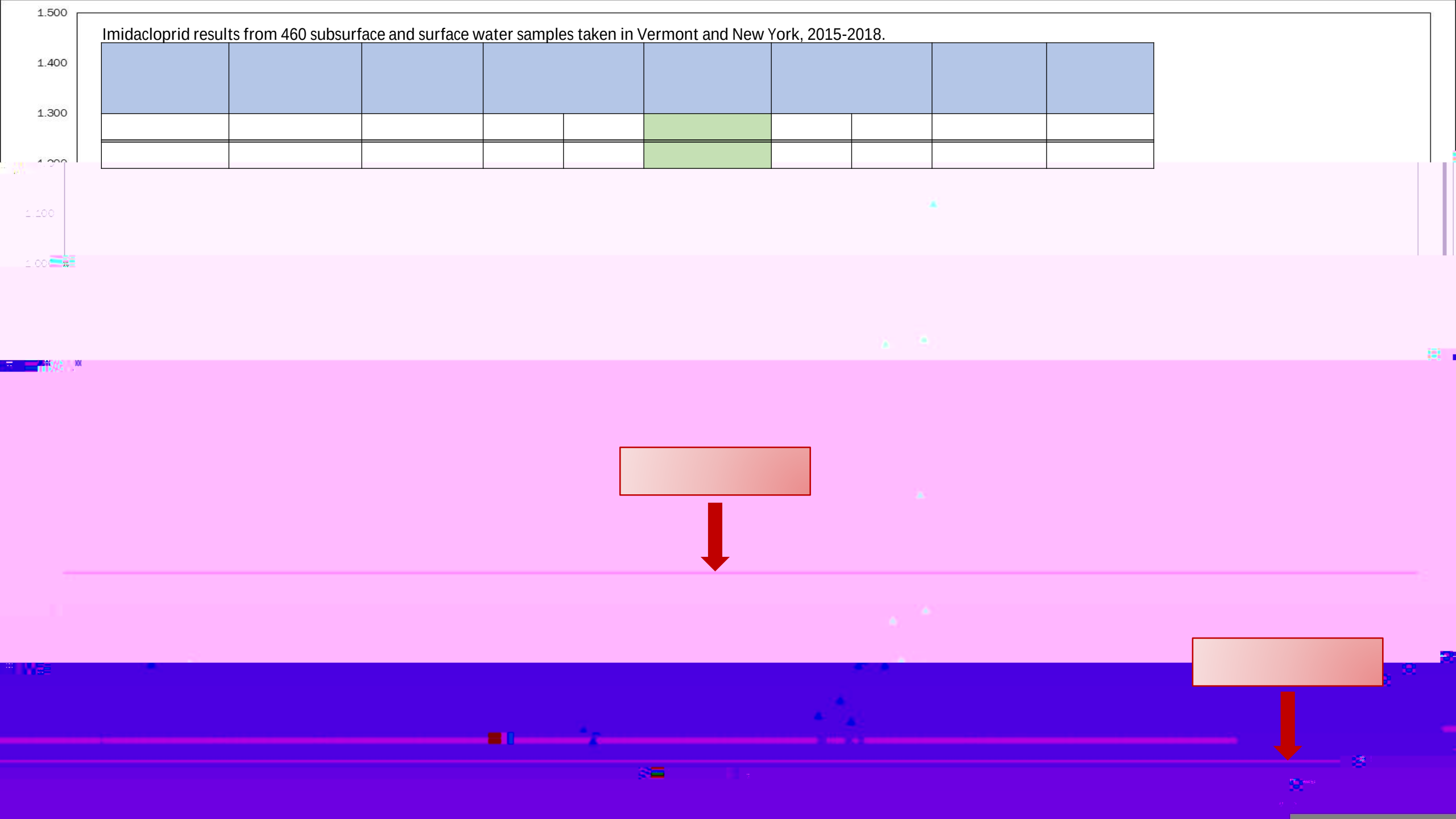
Summary results from the subsurface and surface water samples analyzed for neonicotinoids, Chazy, NY, 2017-2018. (n=128)

Neonicotinoid	Positive detection	Detection range	Acute benchmark*	Chronic benchmark*	Results ≥ Acute benchmark*
	#	ppb	ppb	ppb	#
Thiamethoxam	25	0.06 - 6.48	17.50	-	0
Clothianidin	13	0.08 – 0.40	11.00	1.10	0
Imidacloprid	0	<0.05	0.385	0.01	0

*aquatic invertebrates


24.00
22.00
Thiamethoxam results from 460 subsurface and surface water samples taken in Vermont and New York, 2015-2018.


14.00
12.00
10.00
(PPB)
6.00
4.00
2.00


1.500
1.400
1.300
Imidacloprid results from 460 subsurface and surface water samples taken in Vermont and New York, 2015-2018.

Best Management Practices (BMP's) for using neonicotinoid treated seed

Use integrated pest management (IPM) Practices:

Know which of your crop production practices (tillage, rotations, weed and nutrient management) increase or reduce the likelihood for stand-reducing insect pests(wire worms, grubs, etc.).

Use alternate crop production practices (i.e. cultural, mechanical, biological) where possible, to reduce risk of insect pests.

Scout fields to determine whether an insect pest is present and poses an economic risk to warrant using neonicotinoid seed treatments.

Keep records of crop practices and insect infestations to inform your decisions for seed treatment usage in similar situations.

Using Treated Seeds

Use only where necessary

At the lowest effective treatment rate.

When the use of neonicotinoids is not warranted, purchase seed not treated with neonicotinoids.

Before planting neonicotinoid treated seed, read and follow the directions for proper handling during transport, storage, and use.

Communication and Cooperation

In order to help reduce the risk to pollinators, it is important for farmers and beekeepers to talk to each other.

Before planting with neonicotinoid treated seed, farmers should notify any nearby beekeepers.

Nearby beekeepers should let farmers know the locations of any hives near farm fields.

Farmers should control flowering weeds in the field and around field edges before planting by mowing or tillage so that pollinators are not attracted to in-field foraging.

Handling and Planting

Help keep the treatment on the seed during storage and handling by not storing seed under extreme temperatures and excessive humidity.

The use of vacuum planters poses a higher risk of pollinator exposure of neonicotinoid dust from drift. Farmers should take measures to reduce insecticide containing dust exhausted from planters.

Pay special attention while adding treated seed to your planter to reduce dust generated from abrasion.

Avoid loading treated seed into planter near pollinator foraging areas.

Plant neonicotinoid treated seed at recommended seeding rate and depth.

Avoid planting on windy days when any dust will blow into the environment.

Clean-up and Disposal